

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

**PCT**WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>7</sup> :</b> <b>A01N 57/20, 25/30, 25/02</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 00/15037</b> <b>(43) International Publication Date:</b> 23 March 2000 (23.03.00)
<b>(21) International Application Number:</b> PCT/GB99/02726 <b>(22) International Filing Date:</b> 18 August 1999 (18.08.99) <b>(30) Priority Data:</b> 9819693.4 10 September 1998 (10.09.98) GB <b>(71) Applicant (for all designated States except US):</b> ZENECA LIMITED [GB/GB]; 15 Stanhope Gate, London W1Y 6LN (GB). <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> BEAN, Michael, John [GB/GB]; Jealotts Hill International Research Centre, Bracknell, Berkshire RG42 6ET (GB). HOPKINS, Derek, John [GB/GB]; Jealotts Hill International Research Centre, Bracknell, Berkshire RG42 6ET (GB). OTTAWAY, Alan, Victor [GB/GB]; Zeneca Agrochemicals, Yalding, Maidstone, Kent ME18 6HN (GB). FORMSTONE, Carl, Andrew [GB/GB]; Zeneca Agrochemicals, Yalding, Maidstone, Kent ME18 6HN (GB). <b>(74) Agents:</b> RICKS, Michael, James et al.; Intellectual Property Dept., Zeneca Agrochemicals, Jealotts Hill International Research Centre, Jealott's Hill Research Station, P.O. Box 3538, Bracknell RG42 6YA (GB).		<b>(81) Designated States:</b> AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, MI, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>
<b>(54) Title:</b> GLYPHOSATE FORMULATION  <b>(57) Abstract</b>  A storage-stable high-strength aqueous glyphosate concentrate, preferably containing greater than 400 g/l glyphosate expressed as acid, comprises the potassium salt of glyphosate, an alkylglycoside surfactant and an alkoxyated alkylamine surfactant at a preferred total concentration of alkylglycoside and alkoxyated alkylamine from about 160 to 300 g/l and at a preferred ratio of alkylglycoside to alkoxyated alkylamine of from about 1 part by weight of alkylglycoside per 1 part by weight of alkoxyated alkylamine to about 5 parts by weight of alkylglycoside per 1 part by weight of alkoxyated alkylamine.		

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IR	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PI	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	IJ	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

### GLYPHOSATE FORMULATION

This invention relates to a glyphosate formulation and in particular to a high-strength aqueous concentrate formulation of glyphosate.

5        N-phosphonomethylglycine (referred to herein by the common name glyphosate) is a well-known herbicide which is generally used in the form of its salts. Glyphosate may be formulated in a wide variety of liquid and solid compositions designed to cover a range of commercial applications. This invention concerns liquid concentrate formulations which are designed to be diluted prior to use. Many such liquid concentrates are sold commercially but  
10 there are strong commercial and environmental reasons for seeking to increase the concentration of glyphosate in the aqueous formulation beyond that which is commonly available. It is readily apparent that a high-strength aqueous concentrate formulation provides a given dose of glyphosate in a smaller liquid volume, resulting in significant advantages in terms of reduced transport, storage and handling costs and reduced and more  
15 convenient container disposal.

It is well understood that in commercial practice it is necessary to enhance the activity of glyphosate by the use of one or more surfactants and many effective individual surfactants or mixed surfactant systems have been published in the literature. It is possible to add a desired surfactant system separately into a tank mix at the same time that the aqueous  
20 glyphosate concentrate is diluted, and the surfactant system may thus be omitted from the concentrate and added separately at the tank mix stage. Clearly however the addition of a separate component at the tank mix stage constitutes an additional step prior to spraying the herbicide and requires the user to undertake accurate measurement of mixing volumes to ensure the correct proportions in the final product. There is a need therefore for high-  
25 strength glyphosate concentrates in which an effective proportion of a surfactant system is "built-in" to the composition. It is this factor which has hitherto limited the practical realisation of effective high-strength glyphosate concentrates containing surfactant, since such concentrates have to be physically stable over extended storage at the possible extremes of ambient temperatures likely to be encountered in commercial usage. It is exceptionally  
30 difficult to "build-in" effective levels of conventional surfactant systems to high-strength formulations, for example formulations containing glyphosate salts at a concentration of greater than 400 or 450 g/l based on glyphosate acid.

A still further problem which is encountered in highly concentrated systems incorporating both a salt of glyphosate and a surfactant system is that of viscosity. The advantages of having a low-volume, high-strength composition will to a greater or lesser extent be negated in practice if the composition is too viscous to be poured conveniently from the container or is too viscous for residues to be washed rapidly from the container. This is of particular importance if the product is to be supplied in bulk for large-scale users.

Many salts of glyphosate are disclosed in the literature, but extensive commercial use has only been made of liquid concentrates containing the trimethylsulphonium salt and the isopropylamine salt. The ammonium or sodium salt is used in some solid formulations. We have now found that the potassium salt of glyphosate is especially well suited to the provision of a high-strength aqueous concentrate of glyphosate since it is readily soluble in water to form relatively high density solutions (about 1.45 g/cc). Extensive investigation of conventional surfactant systems has shown however that it is exceptionally difficult to build-in effective levels of surfactant to provide a physically stable high-strength composition containing salts of glyphosate such as the potassium salt.

According to the present invention there is provided a high-strength aqueous glyphosate concentrate comprising the potassium salt of glyphosate, an alkylglycoside surfactant and an alkoxylated alkylamine surfactant.

As used herein, the term "high-strength" aqueous glyphosate concentrate indicates a concentrate in which the glyphosate concentration is greater than 400 g/l and more particularly greater than 440 g/l based on glyphosate acid content. It should be noted that, unless otherwise stated, all concentrations of glyphosate are given herein in terms of the percentage by weight of glyphosate acid even when the glyphosate is present as a salt. In general a practical upper limit of the glyphosate concentration will be determined by viscosity considerations. As discussed below, viscosity modifying agents may be required if the concentration is much in excess of 500 g/l, whilst formulations in which the concentration is in excess of 550 g/l will tend to be too viscous for effective commercial usage using conventional equipment. Compositions of the present invention wherein the glyphosate content is from about 440 g/l to about 540 g/l are especially effective.

Preferably the total content of the alkylglycoside and alkoxylated alkylamine surfactant system in the aqueous concentrate is from about 160 to 300 g/l, for example from about 200 to 270 g/l. Whilst additional surfactants other than the alkylglycoside and the

alkoxylated alkylamine may be used if desired, the presence of such additional surfactants may adversely affect the formulation stability when used at the upper limit of concentration of alkylglycoside and alkoxylated alkylamine.

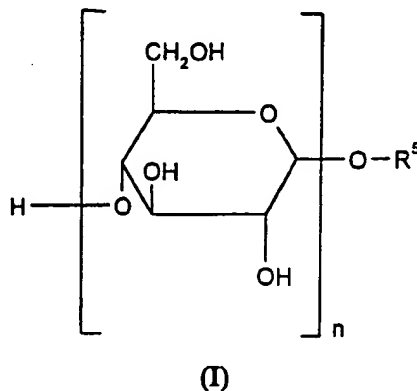
The ratio of alkylglycoside to alkoxylated alkylamine in the surfactant system is preferably from about 1 part by weight of alkylglycoside per 1 part by weight of alkoxylated alkylamine to about 5 parts by weight of alkylglycoside per 1 part by weight of alkoxylated alkylamine. An especially preferred ratio is from about 1.5 or more preferably 2 parts by weight of alkylglycoside per 1 part by weight of alkoxylated alkylamine to about 4 parts by weight of alkylglycoside per 1 part by weight of alkoxylated alkylamine.

Whilst the scope of the present invention is not to be taken as being limited by any one particular theory and whilst the mode of action of surfactants is extremely complex, it is believed that the alkylglycoside and the alkoxylated alkylamine function by different general mechanisms and are able to work together to provide the maximum adjuvant effect together with the optimum capacity to be built-in to the high-strength formulation without loss of physical stability of the formulation. Specifically, the alkylglycoside is believed to operate essentially passively, being located largely on the leaf surface and moderating the physical properties of the spray solution as it dries to ensure effective uptake. One phenomenon which is believed to be a consequence of this mode of action is that if the loading of alkylglycoside is increased past a particular optimum range, the enhancement of activity is no longer proportional to the loading of alkylglycoside. Addition of further alkylglycoside then has relatively little effect. Alkoxylated alkylamines on the other hand are believed to operate by a more active mechanism in which the alkoxylated alkylamine penetrates the leaf cuticle and provides enhancement of biological activity by facilitating penetration of the active ingredient into the plant system.

Thus whilst it would be possible to incorporate a relatively high loading of alkylglycoside into a high-strength potassium glyphosate formulation, the enhancement of biological activity would tend to be less than optimum and in addition the viscosity of the resultant solution would tend to be undesirably high. Alkoxylated alkylamines on the other hand have a relatively low compatibility threshold in high-strength glyphosate concentrates. We have found however that the claimed glyphosate composition combines the high-strength capability of the potassium salt with the optimum "passive" enhancement of activity by the alkylglycoside and the "penetrant" enhancement provided by relatively low levels of

alkoxylated alkylamine which are compatible with the system as a whole. The claimed high-strength glyphosate composition thus contains a much higher loading of total surfactant than has hitherto proved possible for such high-strength compositions and as a result exhibits an excellent biological activity, comparable with many commercially formulations of much lower glyphosate strength. Appropriate selection of the alkoxylated alkylamine, as discussed in greater detail below, additionally ensures an operating viscosity of the concentrate which is well within acceptable commercial limits.

The alkylglycoside for use in the present invention may be obtained by the reaction of alkanols with glucose or other mono- or di- or polysaccharides. As used herein the term "alkylglycoside" includes an alkylmonoglycoside and an alkylpolyglycoside. Preferred alkylglycosides for use in the present invention are alkylglucosides obtained by the reaction of glucose with a straight or branched chain alkanol or mixture of alkanols, for example a mixture of alkanols containing 7 to 18, preferably 7 to 16 carbon atoms for example 8 to 10 carbon atoms or a single branched chain alcohol containing 8 carbon atoms. The number of glucose groups per alkyl group in the molecule may vary and alkyl mono- or di- or polyglucose or saccharide derivatives are possible. Commercial alkylpolyglucosides usually contain a mixture of derivatives having an average number of glucose groups per alkyl group. Thus alkylglycosides have the general formula (I)



20

wherein  $n$  is the degree of polymerisation and is typically within the range from 1 to 3, for example from 1 to 2, and  $R^5$  is a branched or straight chain alkyl group having from 4 to 18 carbon atoms or a mixture of alkyl groups having an average value within the given range.

Typical of alkylglycosides is the product commercially available under the trade names AL2042 (Imperial Chemical Industries PLC) and AGRIMUL PG2067 (Henkel Corp) wherein  $n$  is an average of 1.7 and  $R^5$  is a mixture of octyl (45%) and decyl (55%), the

25

product commercially available under the trade name AGRIMUL PG2069 (Henkel Corp) wherein n is an average of 1.6 and R<sup>s</sup> is a mixture of nonyl (20%), decyl (40%) and undecyl (40%) and 2-ethyl-1-hexylglycoside wherein R<sup>s</sup> is 2-ethyl-1-hexyl and is derived from a single branched alcohol (2-ethyl-1-hexanol) and the degree of polymerisation (n) is from 1 to 5 2, for example from 1.5 to 1.9, such as about 1.75.

Suitably the alkyl group in the alkoxyated alkylamine contains from 8 to 22 carbon atoms (or an average of from 8 to 22 carbon atoms if a mixture of alkyl groups is present) and may be linear or branched. It is especially preferred that the alkyl group contains from 10 to 20 carbon atoms. Specific examples of preferred alkoxyated alkylamines are alkoxyated 10 derivatives of cocamine, tallowamine, oleylamine and stearylamine. Typically such alkoxyated alkylamine surfactants are available with an average degree of alkoxylation of from 1 to about 15. Suitable alkoxy groups include ethoxy, propoxy or a mixture thereof. Ethoxy is particularly preferred. Thus the alkoxyated alkylamine is suitably an ethoxylated or propoxylated or mixed ethoxylated and propoxylated C8 to 22 alkylamine having a degree 15 of alkoxylation of from 1 to about 15.

Whilst it is possible to use an alkoxyated alkylamine in the composition of the present invention having an average degree of alkoxylation (or more specifically ethoxylation) in the commercially available range, for example from 1 to about 15, we have found that ethoxylated alkylamines having a high degree of ethoxylation are less compatible 20 with the high-strength composition than are those having a lower degree of ethoxylation. Thus it is preferred that the average degree of alkoxylation (or more specifically ethoxylation) is from 2 to 12. We have also found however that alkoxyated alkylamines having a low degree of alkoxylation (or more specifically ethoxylation) of about two tend to increase the viscosity of the composition. Thus it is especially preferred that the average 25 degree of alkoxylation (or more specifically ethoxylation) is from 4 to 12. An example of a particularly suitable alkoxyated alkylamine is an ethoxylated alkylamine having an average degree of ethoxylation of about 5, for example an ethoxylated cocoamine having an average degree of ethoxylation of about 5.

If the viscosity of the composition is high, for example if the concentration of the 30 potassium glyphosate is towards the upper limit of the range, it may be appropriate to add a viscosity modifying agent. Suitable viscosity modifying agents include propylene glycol. As is conventional practice with formulations containing an alkylglycoside, an antifoam may



be added. Numerous antifoams are known in the art and commercially available antifoams operate at very low concentrations (for example less than 5 g/l) and hence do not have a major impact on the loading of the composition.

Other conventional additives such as humectants, activity enhancers (such as  
5 inorganic ammonium salts), anti-freeze agents, wetters, or other additional surfactants may be added if desired, but it is generally preferred not to add to the loading of the composition by the addition of such materials, particularly if they are present in substantial quantities. Similarly, additional water-soluble herbicides or other agrochemicals such as fungicides and insecticides may be incorporated if desired, but the present invention is primarily concerned  
10 with compositions in which the only active agrochemical ingredient is glyphosate.

When diluted for use, compositions of the present invention are active against a broad range of weed species including monocotyledonous and dicotyledonous species. The compositions are suitably applied directly to unwanted plants (post-emergence application).

Thus according to a further aspect of the present invention there is provided a process  
15 of severely damaging or killing unwanted plants which comprises diluting a concentrated composition of the present invention and applying to the plants a herbicidally effective amount of a said diluted composition.

The rate of application of the composition of the invention will depend on a number of factors including, for example, the identity of the plants whose growth is to be inhibited  
20 and whether the compound is to be applied for foliage or root uptake. As a general guide, however, an application rate of from 0.001 to 20 kilograms per hectare is suitable while from 0.025 to 10 kilograms per hectare may be preferred.

The invention is illustrated by the following Examples in which all parts and percentages are by weight unless otherwise stated.

EXAMPLES 1 to 15

In the following Examples, compositions were prepared by dissolving glyphosate acid (referred to in the tables as PMG acid) in sufficient of a 50% by weight potassium hydroxide solution to neutralise the acid and form the potassium salt. Thus for example  
5 when the concentration of PMG acid was 450 g/l, the corresponding proportion of 50% potassium hydroxide solution was 334 g/l. The remaining components were added in the indicated proportions (g/l) and water was added proportionately to make up the litre.

All formulations were evaluated for physical stability on storage at 54°C for 4 weeks and at - 10°C for two weeks. Formulations given stability code "A" in Tables 1 to 4 below  
10 remained physically stable after this test. Formulations given stability code "B" remained physically stable at room temperature but failed to remain stable during the 4 week test at 54°C, showing evidence of phase separation.

The alkylglycoside used (APG) in Tables 1 to 4 was AGRIMUL PG2067 whose composition has been given earlier.

15 ETHOMEEN C15 (ETHOMEEN is a trademark of Akzo Nobel)  
is an ethoxylated cocoamine having an average degree of ethoxylation of 5.

ETHOMEEN C12 is an ethoxylated cocoamine having an average degree of ethoxylation of 2.

ETHOMEEN T15 is an ethoxylated tallowamine having an average degree of  
20 ethoxylation of 5.

ETHOMEEN T25 is an ethoxylated tallowamine having an average degree of ethoxylation of 15.

ETHOMEEN S22 is an ethoxylated soyamine having an average degree of ethoxylation of 12.

Table 1

Example No	1	2	3	4	5	6	7
PMG - acid (g/l)	540	500	450	450	450	450	450
Alkylglucoside (g/l)	214	172.2	229	197	161	160	157
"Ethomeen" C15 (g/l)	50	46.3	50	50	75	75	100
Antifoam (g/l)	0.7	1.3	0.7	0.7	0.7	0.7	0.7
Stability code	A	A	A	A	A	A	A

Table 2

Example No	8	9	10	11
PMG - acid (g/l)	540	450	450	450
Alkylglucoside (g/l)	186	197	161	126
"Ethomeen" T15 (g/l)	50	50	75	100
Antifoam (g/l)	0.7	0.7	0.7	0.7
Stability code	A	A	A	A

5

Table 3

Example No	12
PMG - acid (g/l)	450
Alkylglucoside (g/l)	197
"Ethomeen" C15 (g/l)	10
"Ethomeen" S22 (g/l)	40
Antifoam (g/l)	0.7
Stability code	A

Example No	13
PMG - acid (g/l)	450
Alkylglucoside (g/l)	197
"Ethomeen" C15 (g/l)	10
"Ethomeen" T25 (g/l)	40
Antifoam (g/l)	0.7
Stability code	B

Table 4

Example No	14
PMG - acid (g/l)	450
Alkylglucoside (g/l)	229
"Ethomeen" C12 (g/l)	50
Antifoam (g/l)	0.7
Stability code	A

Example No	15
PMG - acid (g/l)	540
Alkylglucoside (g/l)	186
"Ethomeen" C15 (g/l)	50
Antifoam (g/l)	1.3
Propylene glycol	25
Stability code	A

Examples 12 and 13 illustrate that physical stability of the formulation is satisfactory given an average ethylene oxide content of the ethoxylated alkylamine of 10.6 (10 parts "Ethomeen" C15 and 40 parts "Ethomeen" S22), but has less than optimum physical stability when the average ethylene oxide content of the ethoxylated alkylamine is 13 (10 parts "Ethomeen" C15 and 40 parts "Ethomeen" T25).

In Example 15 the viscosity of the formulation containing 540 g/l of glyphosate acid was reduced by the addition of propylene glycol.

10

EXAMPLES 16 and 17

The procedure of Examples 1 to 15 was followed except that the alkylglycoside used was 2-ethyl-1-hexylglycoside having a degree of polymerisation of about 1.75. Formulations having the compositions shown in Table 5 were prepared and were found to be stable at least over the range -10°C to 40°C.

15

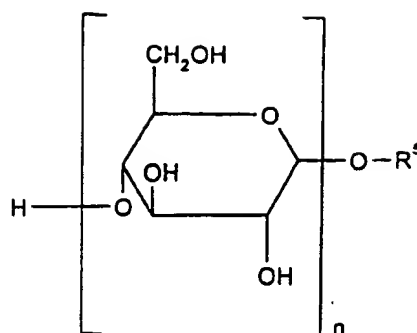
Table 5

Example No	16
PMG - acid (g/l)	450
2-ethyl hexyl glucoside (g/l)	197
"Ethomeen" C15 (g/l)	50

Example No	17
PMG - acid (g/l)	500
2-ethyl-hexyl glucoside (g/l)	172.2
"Ethomeen" C15 (g/l)	46.3

CLAIMS

1. A high-strength aqueous glyphosate concentrate comprising the potassium salt of glyphosate, an alkylglycoside surfactant and an alkoxylated alkylamine surfactant.  
5
2. A glyphosate concentrate according to claim 1 wherein the glyphosate concentration is greater than 400 g/l based on glyphosate acid content.
3. A glyphosate concentrate according to claim 2 wherein the glyphosate concentration  
10 is from 440 to 540 g/l based on glyphosate acid content.
4. A glyphosate concentrate according to any of the preceding claims wherein the total content of the alkylglycoside and the alkoxylated alkylamine surfactant system is from 160 to 300 g/l.  
15
5. A glyphosate concentrate according to claim 4 wherein the ratio of alkylglycoside to alkoxylated alkylamine in the surfactant system is from 1 part by weight of alkylglycoside per 1 part by weight of alkoxylated alkylamine to about 5 parts by weight of alkylglycoside per 1 part by weight of alkoxylated alkylamine.  
20
6. A glyphosate concentrate according to claim 5 wherein the ratio of alkylglycoside to alkoxylated alkylamine in the surfactant system is from 2 parts by weight of alkylglycoside per 1 part by weight of alkoxylated alkylamine to about 4 parts by weight of alkylglycoside per 1 part by weight of alkoxylated alkylamine.  
25
7. A glyphosate concentrate according to any on the preceding claims wherein the alkylglycoside has the formula



(I)

wherein  $n$  is the degree of polymerisation and is within the range from 1 to 3 and  $R^5$  is a branched or straight chain alkyl group having from 4 to 18 carbon atoms or a mixture of alkyl groups having an average value of from 4 to 18 carbon atoms.

8. A glyphosate concentrate according to claim 7 wherein  $R^5$  is 2-ethyl-1-hexyl  $n$  is from 1 to 2.
9. A glyphosate concentrate according to any of the preceding claims wherein the alkoxyated alkylamine is an ethoxylated or propoxylated or mixed ethoxylated and propoxylated C8 to 22 alkylamine having a degree of alkoxylation of from 1 to about 15.
10. A glyphosate concentrate according to claim 9 wherein the degree of alkoxylation is from 4 to 12.
11. A glyphosate concentrate according to claim 1 wherein the concentration of the potassium salt of glyphosate is greater than 400 g/l based on glyphosate acid, the total concentration of the alkylglycoside and alkoxyated alkylamine surfactant system in the aqueous concentrate is from about 160 to 300 g/l and the ratio of alkylglycoside to alkoxyated alkylamine is from about 1 part by weight of alkylglycoside per 1 part by weight of alkoxyated alkylamine to about 5 parts by weight of alkylglycoside per 1 part by weight of alkoxyated alkylamine.

12. A process of severely damaging or killing unwanted plants which comprises diluting a concentrated composition according to any of the preceding claims and applying to the plants a herbicidally effective amount of a said diluted composition.

## INTERNATIONAL SEARCH REPORT

A. National Application No.

PCT/GB 99/02726

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 A01N57/20 A01N25/30 A01N25/02		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC 7 A01N		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used)		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 364 202 A (ICI AUSTRALIA LTD) 18 April 1990 (1990-04-18) page 2, line 1 - line 47; claims; example 1	1,4-10, 12
Y	EP 0 290 416 A (MONSANTO EUROPE SA) 9 November 1988 (1988-11-09) page 2, line 3 - page 3, line 10 page 3, line 14 - line 29 page 3, line 46 - line 63; table 3	1,4-7,9, 10,12
Y	WO 98 15181 A (ZENECA LTD ; WIKLEY PHILIP SIMON (GB)) 16 April 1998 (1998-04-16) page 1, line 3 - line 19 page 2, line 11 - page 3, line 20 page 6, line 29 - page 7, line 9; example 1.10	1,8
-/-		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "Z" document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report
23 November 1999		30/11/1999
Name and mailing address of the ISA European Patent Office, P.B. 6818 Patentkan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016		Authorized officer  Muellners, W



# INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/02726

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>WO 97 32476 A (TOMIOKA KEIICHIRO ;MONSANTO CO (JP); OKANO TETSUYA (JP); HASEBE KE) 12 September 1997 (1997-09-12) page 1 -page 7, paragraph 2 page 11, last paragraph -page 12, paragraph 1; examples</p>	1-12

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/02726

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0364202 A	18-04-1990	AT 126667 T	15-09-1995
		AU 627503 B	27-08-1992
		AU 4243489 A	26-04-1990
		CA 2000513 A	13-04-1990
		DE 68923926 D	28-09-1995
		DE 68923926 T	22-02-1996
		GR 3017209 T	30-11-1995
		JP 2169504 A	29-06-1990
		JP 2726715 B	11-03-1998
		NZ 230875 A	26-02-1991
EP 0290416 A	09-11-1988	AT 90835 T	15-07-1993
		CA 1324727 A	30-11-1993
		DE 3881954 A	29-07-1993
		DE 3881954 T	30-09-1993
		DK 234888 A	30-10-1988
		EG 19063 A	29-09-1994
		ES 2058337 T	01-11-1994
		FI 881997 A,B,	30-10-1988
		IE 62968 B	08-03-1995
		IL 86217 A	06-09-1992
		JP 2526270 B	21-08-1996
		JP 63284106 A	21-11-1988
		PT 87352 A,B	01-05-1988
		CN 1031789 A,B	22-03-1989
WO 9815181 A	16-04-1998	AU 4565097 A	05-05-1998
		EP 0929222 A	21-07-1999
WO 9732476 A	12-09-1997	AU 2231597 A	22-09-1997
		BR 9702106 A	12-01-1999
		CN 1190327 A	12-08-1998
		EP 0824315 A	25-02-1998
		JP 9295901 A	18-11-1997
		NZ 328990 A	29-06-1999
		US 5948421 A	07-09-1999